526
NOV 9 1989
507-J-1
HE20.9302:H 79/2

COSTING HOSPITAL NURSING SERVICES

A REVIEW OF THE LITERATURE

COMPLETED

BEST COPY AVAILABLE

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Health Resources and Services Administration

ORIGINAL

HEALTH RESOURCES AND SERVICES ADMINISTRATION

"HRSA—Helping Build A Healthier Nation"

The Health Resources and Services Administration has leadership responsibility in the U.S. Public Health Service for health service and resource issues. HRSA pursues its objectives by:

- Supporting states and communities in delivering health care to underserved residents, mothers and children and other groups;
- Providing health services for Native Americans;
- Participating in the campaign against AIDS;
- Serving as a focal point for federal organ transplant activities;
- Providing leadership in improving health professions training;
- Tracking the supply of health professionals and monitoring their competence through operation of a nationwide data bank on malpractice claims and sanctions; and
- Monitoring developments affecting health facilities, especially those in rural areas.

BEST COPY AVAILABLE

CO$TING HOSPITAL NURSING SERVICES

A REVIEW OF THE LITERATURE

SUSAN LAMPE, R.N., M.S.

August 1987

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Health Resources and Services Administration
Bureau of Health Professions
Division of Nursing

BEST COPY AVAILABLE

This literature review was prepared pursuant to Public Health Service Contract Number 240-86-0034 between the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, and The Circle, Inc. of McLean, Virginia.

Project Officer:

Patricia A. Deiman, R.N., M.N.A., M.P.H.
Division of Nursing

Project Director:

Daniel R. Tisch
The Circle, Inc.

Nurse Consultants:

Marie Manthey, R.N., M.N.A.
Susan Lampe, R.N., M.S.
Creative Nursing Management, Inc.

This publication is for sale by the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. Order by accession number HRP-0907983.

FOREWORD

The enactment of the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982 began a drastic restructuring of the delivery of health care in the United States. In an effort to contain costs and assure quality, the Federal Government introduced a competitive environment to health care providers by changing the method of payment to providers to a prospective payment system based on medical diagnostic related groups. As a result, priorities for institutional survival in 1987 are efficient management, cost-effective staffing patterns, financial accountability, marketing expertise, and expert clinical practice.

Nurse executives are responsible for the largest single labor component in the hospital budget and must have accurate and useful data to scrutinize and control costs in the nursing department. Traditionally, nursing costs have been: (1) included in the room and board charge, (2) never clearly identified or itemized, or (3) budgeted on the basis of projected census and average hours of nursing time per patient. However, nursing research has shown that different patients require different amounts of nursing time, and therefore new methods and creative approaches to costing nursing services are required. Nurse executives must have detailed knowledge of nursing costs to assure that the fair share of the prospective payment is allocated to the nursing department and to participate in hospital negotiation of contracts with third-party payers.

This document brings together information from the nursing and hospital literature related to costing nursing services. Nurse executives, whether from small or large institutions, will find useful this single reference source for the historical perspective on costing, major models and tools for obtaining cost data, the adaption of patient classification systems to generate data, new models and tools, and consideration of future issues.

This publication is a companion volume to the Division of Nursing's report of a conference held in April 1987. The report, Costing Hospital Nursing Services: Report of the Conference, contains papers elaborating on the current situation in costing hospital nursing services and presents recommendations for action by nursing executives and nursing organizations. These two documents together provide a valuable resource for nurse executives to meet the challenges of the new health care delivery systems.

Jo Eleanor Elliott
Director
Division of Nursing

BEST COPY AVAILABLE

CONTENTS

		page
I.	Historical perspective	1
	A. Retrospective payment and per diem model	2
	B. Relative intensity measures	3
II.	Diagnosis related groups and nursing costs	4
III.	The need to determine nursing cost	6
IV.	Organizational belief system	7
	A. Basic organizational beliefs	7
	B. Key nursing beliefs	8
	C. Organizational requirements	8
V.	Patient classification system	9
	A. Patient classification and costing	9
	B. Issues related to the use of patient classification acuity systems	13
	C. Alternatives to task oriented patient classification	15
VI.	Staffing system	17
VII.	Costing system	19
VIII.	Variable billing	22
IX.	Management uses for cost data	27
X.	Audit system	28
XI.	Cost/quality relationship	29
XII.	Future	30
Glossary of terms		34
References		41

BEST COPY AVAILABLE

A REVIEW OF THE LITERATURE ON COSTING HOSPITAL NURSING SERVICES

Determining the cost of providing nursing care to hospital patients is a major concern for nursing administrators across the country in 1987. Prospective payment systems (PPSs) and diagnosis related groups (DRGs) have revolutionized the way hospitals are paid for providing care to patients, provided incentives for determining costs, and forced hospitals to work toward providing services in a cost efficient manner.

I. HISTORICAL PERSPECTIVE

An historical perspective is useful to understanding the current health care situation, and many authors provide a brief overview as an introduction to their reports on costing nursing services (Aydelotte 1973; Donabedian et al. 1984; Shaffers 1985; Thompson and Diers 1985; Walker 1983; Halloran 1985). Kirby (1986) specifically reviews the history of resource management in nursing. Mowry and Korpman (1986) begin with a discussion of the major social and political changes of the 1960s that brought the Medicare legislation and infusion of Government dollars into the health care system. In 1960, health care as a percentage of the gross national product (GNP) was 5.3 percent; in 1983, it was 10.8 percent. The largest single category of expenditures was hospital care, which in 1983 accounted for 42 percent of all health care expenditures.

Attempts were made in the 1970s to control rising health care costs and slow the rate of growth of the health care industry through legislation to regulate costs and monitor the quality of services. Certificate-of-need requirements and professional standards review organizations (PSROs) were mandated for hospitals, and some State governments implemented rate-setting programs to control costs. Despite these regulations, costs continued to rise. With study, it became apparent that these inflationary trends were related largely to the payment methodology for Medicare: retrospective reimbursement of "reasonable" costs incurred by the hospital when caring for patients had led to nearly uncontrolled resource consumption. DiVestea (1985) points out that the insatiable consumption was fueled by the fact that patients and physicians, who controlled resource use in the hospitals, were insulated from the cost consequences of the consumption because of the payment mechanisms through third parties. It became clear that the only way for the Federal Government to control health care expenditures would be to make fundamental changes in the payment mechanism for Medicare/Medicaid. With the enactment of the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982, the Government sought to create a competitive environment to reduce health care costs,

BEST COPY AVAILABLE

change the amount of reimbursement hospitals receive for inpatient services, and require the development of legislation for the PPS. This legislation is significant because, for the first time in history, hospitals and other health care providers have a financial incentive to operate in a cost-conscious manner. The PPS reimburses hospitals based upon their case mix of DRGs, which limits the amount of money coming into the system, thereby forcing hospitals to operate differently and assume a business orientation with emphasis on the costs associated with providing care per DRG.

A. Retrospective Payment and Per Diem Model

Under retrospective payment systems, hospitals had no incentive to determine true costs for nursing because the Medicare reimbursement system included nursing department costs as part of the room and board charge to the patient. Mowry and Korpman (1986) describe Medicare cost allocation legislation that divided costs into "revenue producing centers" (ancillaries including clinical laboratory and radiology) and routine services (those identified with daily room rate, including nursing), which were designated "cost centers." The hospital view of nursing as a cost per patient day was legislated, and no one really knew or cared what nurses did in the hospital because it did not change what the hospital was paid.

Although nursing costs were not being identified, the work of nursing began to be quantified in the 1960s using management engineering methodology. According to Young et al. (1981), current use of the terms patient classification and patient classification system (PCS) arose following the work of Connor in 1960 at The Johns Hopkins Hospital, which resulted in the development of a patient classification scheme that identified patient requirements for nursing care in quantitative terms. The recognition that patient needs, although variable, could indeed be quantified and predicted led to improved procedures for the determination and allocation of nursing resources. The prime adopter of Connor's findings was the Commission for Administrative Services in Hospitals (CASH), which modified Connor in application. The establishment of CASH's program in nursing, its feasibility, and apparent success gave rise to many other classification methods, of which five specific consultant groups are reviewed by Aydelotte (1973). Research to develop acuity-based staffing systems has shown that different patients require different amounts of nurse time. The per diem method of staff allocation was shown to be inadequate (Vanderzee 1984). Thus, within the nursing profession, interest grew in the 1970s to define nursing workload using patient need criteria in place of census. The Joint Commission for Accreditation of Hospitals (JCAH) began to require PCSs for determination of nurse staffing and the number of available systems grew rapidly.

Today, many PCSs for nursing staff allocation are available. Some are manual; others are automated. Those PCSs which have been described in the literature as the source of data for costing nursing services will be described in Part V of this paper.

B. Relative Intensity Measures

Another effort to quantify nursing resource consumption took place in New Jersey. Shaffer (1985) notes the Case-Mix Nursing Performance Study led to the development of the relative intensity measure (RIM), which was designed to be a case-mix-sensitive measure of resource use for the allocation of inpatient general nursing costs. RIMs studies were initiated by the New Jersey Health Department under a Federal Health Care Financing Administration (HCFA) contract and were studied as the possible basis for rate setting in New Jersey.

Grimaldi and Micheletti describe RIMs (1982) and conclude, "Despite its limitations, the new RIMs study has yielded some valuable insights into the costing of nursing care, which will be helpful in future research. Nevertheless, additional work must be done before RIMs can be used for rate-setting purposes. Statistical problems, questionable assumptions, and counterintuitive results severely hamstring its practical usefulness. Also, the complexity of the method and its limited managerial applications raise doubt about the efficacy of RIMs."

A supporter of RIMs, Toth (1984) states that DRGs are imperative for efficient nursing management and RIMs are an invaluable tool that must not be allowed to be rejected by a system that fears our (nursing) autonomy. Also, Joel (1983) describes the relationship between case-mix and reimbursement. She defends the RIMs methodology as a useful nursing allocation model at a time when the nursing profession needs a patient specific quantitative measure of nursing resource use to promote nursing autonomy.

Countering these arguments, Trofino (1985) reviews the initial RIMs study, methodology, and results and describes a number of weaknesses including:

- small original sample;
- 5-year-old data which is not reflective of changes in health care (i.e., shortened length of stay and new technologies);
- use of complicated formulas to determine costs;
- a major shift in costs from inliers to outliers, when the method was applied to real hospital accounting that

would have resulted in substantial undercollection in approved revenue;

- o nursing resource categories containing patients with differences in nursing resource consumption; and
- o length of stay (LOS) driven outcomes (such as DRGs).

Trofino has begun work with eight New Jersey hospitals to develop patient acuity data from the last 5 years into a costing methodology that is patient specific and DRG specific (Trofino 1986).

RIMs are still under scrutiny but have not been adopted for rate setting in New Jersey.

II. DIAGNOSIS RELATED GROUPS AND NURSING COSTS

PPS has provided hospitals the incentive to determine all care-related costs, including the cost of nursing care. However, the hospital data base or product line is organized by DRG, which is a medical model. Studies of nursing costs per DRG show wide variations within certain DRGs, indicating that DRG classification alone is not a good indicator of nursing workload. No two patients require exactly the same nursing care even though they may be hospitalized for the same diagnoses or procedures. Variables such as coexisting medical problems, age, mental outlook, motivation, dependency, and family support result in different demands for nursing care day-by-day and shift-by-shift.

Mitchell et al. (1984) reported a study of average hours and costs of direct nursing care for four DRGs using a PCS, the range of hours and costs within these DRGs, and the relationship between total hospital charges and cost of direct nursing care. Findings show a very large range in the number of hours of care within each DRG. When Horn's Severity of Illness Index was completed for each patient, the range of resource use within each severity group was much smaller. Average direct nursing costs were 8 percent of average hospital charges.

Giovannetti et al. (1984) reported a study of two DRGs. Whereas the average nursing care costs for DRG 88 (Chronic Obstructive Pulmonary Disease) was almost twice that for DRG 355 (Nonradical Hysterectomy less than 70 years old), the hospital's reimbursement rate for the two is essentially the same. In other words, the nursing care costs accounted for 19 percent of the hospital's payment rate for DRG 88 and only 10 percent for DRG 355. The authors include recommendations for nurse managers to analyze nursing costs.

McClain and Selhat (1984) compared LOS and the total hours of nursing care for three DRG categories and linked these data to

total cost for nursing care within each DRG. Findings show mean LOS exceeds the DRG limit in all three cases. The total nursing hours of care for each patient are reported in each DRG and these hours are translated into total nursing costs.

Mowry and Korpman (1985) studied actual nursing labor costs for 240 acute care patients in 5 DRG categories and showed that some DRGs vary in daily nursing labor costs up to 500 percent over the course of the patient's stay. For some DRGs, the patient's DRG classification is not an adequate measure for determining, assigning, or allocating nursing costs within the institution.

Bargagliotti and Smith (1985) explored whether different patterns of nursing costs existed between profitable DRGs (those categories with reimbursement rates exceeding average hospital charges) and nonprofitable DRGs. Their study also describes the relationship among nursing costs, room charges, and hospital charges. The authors state that the study's findings suggest that while nursing costs may be less than 25 percent of the hospital care dollar, a considerable range in nursing costs exists within and among DRG categories.

Halloran and Halloran (1985) studied over 1,200 records which fell into 1 of 31 DRGs. Nursing workload was measured using the Medicus tool. The results show total nursing care correlated closely (77 percent) with hospital LOS. When LOS was excluded, only 26.3 percent of nursing workload was predicted by medical diagnosis (DRGs). However, over half (52.3 percent) of daily nursing workload was associated with the patient's nursing condition, as indicated by the number of nursing diagnoses.

An American Nurses' Association Center for Research study is reported by McKibbin et al. (1985). The hours and costs of nursing care were calculated and compared within and among 21 most common DRGs in 2 hospitals. The principal findings of the study are that:

- DRG relative cost weights generally appear to reflect differences in nursing resource requirements among the DRGs in the study.
- Some DRGs in the study are interpretable groupings of patients both in terms of the total hours of nursing care by DRG and in terms of the daily pattern of nursing resource consumption over the course of hospitalization.
- Nursing costs, as defined in the study, account for between 20 and 28 percent of hospital costs for two-thirds of the DRGs in the study.

- Sufficient variations in nursing resource utilization patterns and in nursing costs are found to suggest that further study of nursing care, LOS, and DRGs is warranted as a potential mechanism for refining prospective pricing.

Raschak et al. (1985) report a replication study using PCS methodology to determine total cost of nursing care (direct and indirect care) for two groups of DRGs: DRG 039 (lens O.R. procedure) and DRG 210 (hip and femur procedure, except major joint, age 65 or older). They conclude that nursing costs account for a small percentage (7.3-17.4 percent) of total DRG reimbursement.

Fosbinder (1986) described a study establishing the actual cost of nursing care for 13 DRGs. The author states, "The wide variation (6.1 to 13.6 percent) in the percentage of DRG reimbursement used for nursing care at this hospital substantiates that needs of patients don't always correlate with the dollar amount predicted for a given treatment."

The above studies group patients by DRG, but a study by Sherman (1986) reports the use of Disease Staging Methodology (DSM) to compare data gathered from 13 hospitals. DSM is a grouping mechanism developed on a staging concept widely used in oncology. Limitations of DSM are discussed and it is reported to not be useful for standardization.

These studies show wide variation in the cost of nursing when examined in relation to DRGs. Because DRG is presently the primary patient classification methodology that determines hospital reimbursement, nurse administrators need to be aware of these variations and to study the cost of nursing per DRG in their own institutions.

III. THE NEED TO DETERMINE NURSING COST

The PPS has provided a number of compelling reasons to cost nursing services. Because the cost of providing nursing care constitutes the largest single labor cost component for almost every hospital "product," the importance of scrutinizing and controlling those costs is a priority for hospital executives (McCormick 1986).

The archaic method of budgeting based on predicting patient days and averaging hours of care according to service precludes identifying the patient mix upon which economically wise decisions depend. Nursing executives must now prepare budgets that not only predict the acuity of the patient population, but also itemize the cost of care to be rendered, according to degree of acuity. Monies will be allocated among hospital services according to DRG case-mix. Nursing departments whose revenues

BEST COPY AVAILABLE

are currently locked into room and board rates will not be prepared (Ethridge 1985).

Walker (1983) points out that because of the historical view of nursing as a cost center, the cost of nursing care has been synonymous with room rate, which is very high. It is not surprising, therefore, that many assume that the rapidly rising costs of hospital care are due to increased nurses salaries. In fact, most studies show direct nursing costs to be 20 to 30 percent of total hospital charges (Staley and Luciano 1985; Riley and Schaefers 1983; Bargagliotti and Smith 1985).

Bargagliotti and Smith (1985) state, "While nursing costs may be less than 25 percent of the hospital care dollar, a considerable range in nursing costs exists within and among DRG categories. . ." Knowing the costs of providing care for a specific DRG category in a given institution provides managers with a benchmark for assessing the effects of changes in skill mix and practice patterns. Also, knowing the costs of providing care for a given service line provides nurse administrators with the information needed to negotiate care contracts and cost-containment efforts with other departments.

Understanding the need to determine the cost of nursing in hospitals, how does one proceed? This report will follow the systems approach suggested by Van Slyck (1985):

- Organizational Belief System (Prerequisites)
- PCS
- Staffing System
- Costing System
- Audit System.

IV. ORGANIZATIONAL BELIEF SYSTEM

Prerequisites for costing are described by Van Slyck (1985). She states some basic organizational and nursing beliefs are essential.

A. Basic Organizational Beliefs

1. "Charges should be based on costs. This is so logical that one wonders why it needs to be mentioned. The fact, however, is that charges and rates historically have been created by a variety of factors including bottom line requirements . . . the impact on third party reimbursement . . . burying certain services in

overall rates . . . and matching rates with local competitors.

2. "Patients should pay for the services they receive and not subsidize other patients or other services.

3. "The cost of each service, however it is defined, can be measured and that the revenue should be assigned to the department that incurred the cost.

4. "Patients have the right to know what they are paying for.

5. "Each charge makes a contribution (profit) to the organization."

B. Key Nursing Beliefs

1. "Nursing care is an identifiable entity that can be defined, measured, and costed out.

2. "Nursing care, measured in terms of time and skill level, varies with the patient's diagnosis, with the patient's level of illness, and with the patient's needs and wants.

3. "A direct relationship exists between a patient's nursing care requirements and the cost of meeting those requirements."

C. Organizational Requirements

Specific to establishing a variable billing system, other organizational prerequisites are identified by Pajor and Thompson (1986) including:

1. the costing model and data must be recognized as valid by internal systems, especially the finance department;

2. notify and obtain approval from third party payers and agencies involved with regulation of payment for patient services;

3. notify internal departments affected by the new charging including the hospital board, the medical staff, and the nursing staff;

4. set up a system to generate and itemize charges;

5. establish hospital policy governing whether the charge system will be "budget neutral" (no additional revenue will be generated). If so, regulatory bodies

BEST COPY AVAILABLE

controlling hospital net revenue and expenses do not need to give permission; and

6. inform patients and the public.

System design requires consideration of elementary but essential questions: What data do we need? How will we use the data gathered? How can we best access the data? How can we obtain accurate data? Will our efforts have an effect on the "bottom line"? How detailed a system can we afford?

Having met the philosophical and organizational prerequisites, the next step in developing a nurse costing system is to develop a PCS.

V. PATIENT CLASSIFICATION SYSTEM

Patient classification is defined as a method of sorting a population of patients into homogeneous groups (Giovannetti 1985). The work of the nursing department must be identified, defined, and quantified. In many hospitals, if a PCS is in place, it is used solely to determine staffing. A solid data base of patient acuity distributions is not established, and therefore the data are useless for making long-term management decisions (Shaffer 1985). However, with properly designed tools and audit systems, acuity systems can be used to generate cost data.

This chapter will review literature which discusses the use of PCS for costing.

A. Patient Classification and Costing

There is a very large body of literature describing the application of patient acuity models to costing. Details of formulas for costing are presented in Part VII.

Wood (1982) was among the first to describe a cost accounting system based on the amount of care each patient needs. This model at Boston Eye and Ear Infirmary identifies and bills the patient for four separate categories of cost: hospitalization cost per admission, hotel charge per day, variable ancillary services charge, and variable charge for clinical (nursing) care. The cost of clinical care is based on predetermined standards called "clinical care units" that were determined by a peer review process and in collaboration with third party payers. One advantage of this system over other PCSs to determine costs is that nurses are not required to determine individual patient acuity daily for staffing, because patient needs are based on established clinical care units. Wood points out, "It is still an averaging system; however, the data on which it is based are more exact than in the per diem system and the method requires

less time-consuming, costly paperwork than recording every input for every patient."

Another early model for applying PCS data to costing is described by Higgerson and Van Slyck (1982). The authors present an integrated Nursing Care Record that combines charging with documentation and nurse staffing information, which allows variable billing. A factor tool including 44 weighted critical indicators of care was developed at St. Luke's Hospital in Phoenix, Arizona. The patient classification, staffing, and billing system has been in operation since 1973 and has been adapted by a number of other hospitals. Major advantages of this system include the combination of acuity determination and permanent record of care provided and its inclusion of all aspects of nursing care.

Also in 1982, Maher and Dolan described a model linking nursing costs to individual patients based on acuity revealed in patient classification. The authors view the hospital as the interaction of three subsystems or three kinds of resources: human resources (staff), technological resources (methods and equipment), and financial resources (operating budget). Changes in financial resources (caused by PPS) are reflected by changes in human and technology resources so that equilibrium is maintained. Linking costs directly to individual patients is essential for the nurse administrator to make the most efficient and effective use of the human resources available.

Riley and Schaefers (1983) describe a model for determining nursing costs based on patient acuity as determined by PCS. "Conceptually, a very small step will translate staffing requirements into a billing system on the basis of patient intensity." A study was conducted in a 418 bed medical center in 1982. All charges were classified by DRG and 4 of the top 10 (most frequent) DRGs were selected, from which a sample of 98 charts were drawn. The results show a consistent relationship between patient intensity, hours per day of nursing care, direct nursing costs, and total nursing costs. Furthermore, patients received over 5 hours of direct nursing care per day for approximately 17 percent of the total hospitalization charge. The authors present a straightforward formula for nurse administrators to calculate nursing costs.

Curtin (1983c) explored the possibility of linking the cost of delivering nursing care to the DRG system when she described a management system using average nursing classification hours/DRG to establish Nursing Care Strategies (parallel to DRG classification). However, she notes the disadvantage that nursing intensity varies within DRGs.

Walker (1983) examined the question as to how much nursing care in hospitals really costs using a computerized PCS that reflects

BEST COPY AVAILABLE

levels of nursing care. Comparisons are made between direct nursing, indirect nursing, and non-nursing services as a percentage of daily room charge and as a percentage of total charges. This study of 30 patients shows that when the cost of professional nursing is compared to that of other charges for other hospital services, 12 to 20 percent of the total charges are for nursing.

Staley and Luciano (1984) have developed a Patient Classification Index (PCI) at Presbyterian Intercommunity Hospital in Whittier, California, consisting of seven major assessment categories with a number of individual assessment items listed for each major group. Points are allocated for each specific item. The total point level determines which of three levels of routine care or the two levels of intensive nursing care are assigned. The authors also present a costing model using data from this PCS.

The patient information system at Lutheran Medical Center was implemented in 1980 (Nyberg 1984). An adaptation of the Higgerson model, it is a weighted score system for 42 categories of nursing care including teaching, coordination, and planning. On each shift the nurse uses a check sheet to indicate particular nursing activities provided to each patient. The data from the check sheets are entered into a computer, which calculates the total time (direct and indirect) needed to care for each patient. Advantages of this system include the use of a permanent chart form to record patient acuity and nursing care and the design of the system, which collects data regarding patients both individually and collectively. Reports are generated showing daily patient classification categories for all patients and at discharge including the patient's total LOS information. The computer can then show the actual costs of providing nursing care to each patient.

Ethridge (1985) describes the use of a PCS with eight acuity levels to determine hours of nursing care and skill level required for each acuity level to construct a staffing matrix for costing. A relative value unit 1.00 was assigned to represent the hours of care required for the lowest acuity level. The author reveals that conventional nursing revenues allocated to nursing would have been approximately $802,416, but when charged to acuity, actual revenues generated by nursing were $901,646. Overall hospital revenue was unaffected, but the portion attributed to nursing was greater.

The GRASP system described by Meyer (1985) is a patient workload system which has been in use for 10 years across the U.S. and Canada. GRASP considers all patient variables and determines the amount of care (direct and indirect) each patient should receive each day. "The system's precision stems from a detailed and objective workload measurement instrument that permits analysis of data by individual patient, as well as by DRG and cost center.

Direct comparison with other units, departments, and hospitals is possible because of GRASP's use of real times. Real-time data also facilitate verification and updating, and the detailed nature of the GRASP tool provides built-in interrater reliability checks and quality audits to support care-based charge systems."

Rieder (1985) describes the Workload Management System for Nursing (WMSN) used by the U.S. Navy. This system uses 91 activities in 10 domains on the Critical Indicator Guide weighted by points equivalent to 7.5 minutes of nursing time. The sum of the appropriate indicator points places the patient into one of six categories indicating necessary direct and indirect nursing care per 24-hour period. The study uses the WMSN in naval hospitals to investigate the power of the system to explain variations in LOS within DRG, essentially testing the potential for using an acuity-based nursing requirements index as a within-DRG severity adjuster. This study is significant because positive correlation is shown between PCS and LOS only for the maximum patient class measures, and not for mean patient classification data. Mean values are the basis for comparison in most studies in the literature.

Sovie et al. (1985) reported a study including 24,879 patients representing 218,182 patient days on 34 units from July 1982 to June 1983 at University of Rochester, Strong Memorial Hospital. A correlation of patient classification, DRGs, other patient variables, and total cost of patient care was carried out. The report includes a detailed description of how the study was conducted and how the PCS was developed, including definitions, validations, and data analysis.

Results include:

1. the methodology to combine PCS data and other patient care information is valid;

2. nursing cost for direct care as a percentage of room cost is 18 to 24 percent;

3. nursing needs of individual patients within DRGs are extremely variable, as reflected in large coefficient of variation. Therefore, DRGs are not homogeneous from the perspective of nursing acuity;

4. DRG coupled with PCS can be used as predictors of relative needs of the grouping, as demonstrated by comparing estimated budget projections and actual budget expenditures;

5. nursing and hospital management need the assistance of information system technology to develop and track DRG data and cost;

6. DRG data are valuable as a nursing management tool; and

7. DRG data are valuable as a nursing research tool.

The National League for Nursing published Costing Out Nursing: Pricing Our Product in 1985 edited by Franklin Shaffer. This book includes information on several aspects of costing:

- o the historical approaches to costing and the need to separate nursing from the room and board charge;
- o detailed descriptio.. from several authors about application of PCSs to costing;
- o costing in nursing homes and community health nursing; and
- o severity of illness and productivity issues.

B. Issues Related to the Use of Patient Classification Acuity Systems

Consideration of PCSs is not complete without including related issues.

Vaughan (1980) wrote that much of the annual hospital investment used on yearly nurse staffing studies is "reinventing the wheel." The author recommends that nursing organizations take the lead in developing and promoting the use of standard definitions, classifications, and time figures for nursing care, and that money is better spent on improving methodology, rather than each institution working independently.

Countering this proposal, many authors state that to establish a valid PCS, time studies must be carried out in each hospital due to variations in environment, auxiliary support, staff mix, nursing standards, and nursing routines (McKibbin 1985; Sovie 1985; Van Slyck 1985; Vanputte 1985).

Curtin (1984) notes the advantages of an acuity-based costing model:

1. time-based data are easy to incorporate into a reasonable allocation statistic;
2. PCSs allow collection of crucial information on patient acuity;
3. patient acuity information can be stored over time and used to justify acuity and staffing levels/mix;
4. the allocation statistic is patient specific;

5. acuity-based staffing is already required by the JCAH; and

6. control of nursing resources stays in nursing hands.

Curtin's concerns over the use of acuity systems for costing are the relatively crude state of the tool and the problem of maintaining reliable data.

Giovannetti (1985) expresses concern over the use of the generic term "patient classification" to refer exclusively to classification schemes based on patient requirements for nursing care. This is confusing because the possibilities for patient classification are unlimited (i.e., age, sex, blood type, surgical procedure performed, DRG). She suggests it is necessary to include a statement of intent when naming a PCS to decrease confusion. Patients are categorized according to DRGs to identify patient groups according to total hospital resource consumption. Patients are categorized according to their dependency levels to identify requirements for nursing care. In the case of DRGs, the object is to establish a price per hospital stay. In the case of nursing workload measures, the object is to establish nursing care time requirements per shift or per day. These two purposes are distinctly different: one can hardly expect the two schemes to provide comparable or even compatible measures.

Dijkers and Paradise (1986) question whether PCSs designed for staff allocation can be used for nurse costing. Considerations include the following: does the system really determine the amount of nursing care that the patients actually need? is there a discrepancy between the amount of nursing care a patient should have versus the amount of care actually received? and what is the role of nurse skill mix? Caution is also advised in determining the ratio of direct to indirect costs which varies from hospital to hospital.

Other issues surrounding PCSs include:

1. Some staffing systems do not recognize staff mix (RN, LPN, NA) as providing different types of care and that the cost of providing care varies from unit to unit. These systems supply only information on the number of hours of work to be done, assuming that each care giver is equal. McKibbin (1985) states both nursing cost and use of nursing resources deserve examination because all hours of nursing care are not equally expensive.

2. Lawrenz (1986) warns that determining nurse costing on a task-oriented staffing system may lead to the false security that charging for each task accomplished means more revenue for the nursing department -- the more

nurses do and document, the more they will be paid. This concept is left over from the retrospective pay viewpoint. In fact, the total revenue available is limited. The realistic view is to develop standards of care: What must be done (versus everything that could be done) to get this patient discharged in the required number of days (inlier LOS) without complications?

3. Halloran (1986) states that "Nursing is as much an intellectual endeavor as it is a physical one," criticizing the task-oriented nature of most PCSs. To conceptualize nursing as the completion of tasks defined in time intervals is an incomplete view of nursing not recognizing the assessment and evaluation that is done.

Thompson and Diers (1985) state that PCSs may be criticized for relying too heavily on tasks. The question is how to define the patient in terms that can guide, monitor, and evaluate nursing care. What do nurses pay attention to in caring for patients that could be labeled, classified, and then used to prescribe practice and test its effect?

These criticisms of patient acuity systems have created the incentive for new approaches to measuring nursing resource consumption. In addition to quantitative measures (hours per patient per day and acuity levels), there are now qualitative measures using nursing standards and nursing process (Shaffer 1985).

C. Alternatives to Task-Oriented Patient Classification

Recent nursing research has added new concepts including quantifying nursing based on nursing diagnoses (Halloran 1985), standard care plans (Mason 1984), and Nursing Intensity Index (Reitz 1985). These classifications are different in purpose and in content and should not be used interchangeably (Proceedings 1986).

Halloran and Halloran (1985), in a study at the University Hospitals of Cleveland of over 2,500 patient records, report that over half (52.3 percent) of the daily nursing workload was associated with the patient's nursing condition, as indicated by the number of nursing diagnoses. The nursing diagnosis patient measurement device employs standardized terminology (61 nursing diagnoses defined by the North American Nursing Diagnosis Association) to define relative need for nursing care. Nursing diagnoses summarize the nurses' assessment and describe patient conditions and situations that are amenable to nursing intervention. In this manner, nursing care, in one sense, is being defined by specifying problems in patients that nurses have the knowledge and skill to treat. The nursing diagnoses

terminology is a sound method of operationally describing patient problems in terms that are meaningful to nurses. The conditions are not weighted with time values, states Halloran, because it has not been determined that the treatment for grieving is more or less time consuming than that for incontinence. The measurement device is used to help allocate nursing resources and supports the judgments bedside nurses are required to make. The nursing diagnosis-based patient classification scheme supports the resource allocation decisions made by bedside nurses. Nursing diagnoses were three times more effective than DRGs in predicting the quantity of nursing care required.

Halloran and Kiley (1984) describe how a nursing information system may be built on the nursing diagnosis tool. Two of the advantages are (1) nursing diagnosis is one of the more theoretically sound methods of describing patient problems, and (2) the tool can be used by the nurse manager to monitor nurse accountability and ward productivity.

Mason and Daugherty (1984) describe a costing model based on standards of nursing care that specify (1) actual nursing care required by the patient and (2) positive outcomes of care administered according to the process standards. Standards are written as care plans organized by nursing units of care recognizing commonalities of nursing care for patients by health needs, health problems, nursing diagnoses, or medical diagnoses. Once the patient's care plan is determined, the cost and level of nursing care are automatically generated. The authors state the advantages of their model include concurrent audit and a link between quality and quantity care. The system is automated and does not require an additional PCS to determine staffing -- it is built into the unit of care choices, which are updated every shift. The time required for patient care as determined by the units of care choices is printed on a Nurse Manager report, which is used by charge nurses to assign staff for the oncoming shift. Indirect time is assigned by nursing administration as a percentage of direct time. The software also provides a Nursing Administration Report summary of patient cost by DRG at discharge.

Shaffer (1985) supports nursing standards research. He wonders to what extent the quality of care will suffer with the emphasis on cost. "The bottom line in this system will be for the provider to prove that it is providing quality care for the least amount of money in order for the consumer to select and purchase that option. That is why nursing must prepare for this next generation of costing out nursing or pricing our product based on outcome measure."

A major study including all clinical departments at Johns Hopkins Hospital is reported by Reitz (1985a and 1985b). The Nursing Intensity Index was found to be both a valid and reliable

instrument for patient classification. Important features described by Reitz include:

1. the patient, rather than discrete nursing interventions, is the unit of analysis;

2. the nursing process serves as the fundamental framework for instrument design; and

3. the Nursing Intensity Index is applied retrospectively upon discharge by one reviewer, which requires 17 minutes per record. This makes the tool economical and reliable compared to PCSs, where two or three nurses per day must complete the activity tool.

In addition, the author reports the Nursing Intensity Index and the Horn Severity of Illness show strong correlation; many of the DRGs represented in the study were not homogeneous for Nursing Intensity. Reitz states, "By accurately characterizing the differences in patient health problems related to use of nursing resources, the Nursing Intensity Index can become the cornerstone of an integrated, nationwide hospital information system which will enable hospitals to comprehend nursing practice within their walls, and in comparison with other hospitals as well, in a genuinely meaningful and efficiently economical way." (Reitz 1985b)

VI. STAFFING SYSTEM

In this step, staffing standards are established for each acuity level. The staffing standard or matrix is the grid that shows the numbers and types of staff members required for a given number of patients at a given classification level. This is the step in which nursing staff activity is measured and the nursing staff standards for the hospital are determined. The staffing standard must be established for each facility based on data collected at that facility. Time and motion studies are carried out within the hospital and include identification of direct care, indirect care, and unit/employee activities (Van Slyck 1985).

Vanderzee (1984) points out that the methodology for establishing the staffing cost per classification level must be sound, which means establishing the mix of personnel required at each level. A variety of factors is considered in determining mix and forecasting labor requirements per level. The classification system considers items such as admission and discharge patterns, changes in occupancy, number of transfers, changes in acuity, and routine daily activities. Additional factors to be included in the planning portion of the budgeting nursing department are new policies and procedures impacting staffing, the addition of new

services, changes in role expectations, or the nursing model being used.

Pajor and Thompson describe establishing standards of nursing care for each acuity level unique to each unit and conducting concurrent quality assurance monitoring to ensure that the standards result in high quality nursing care.

Aydelotte (1973) advises that "The amount and type of staffing proposed, although based on individual clientele needs and expectations, must be reasonable in cost, be effective in utilization of personnel, consider new roles, delete others, and be effective in results."

Halloran and Kiley (1984) describe points that need to be considered when developing a data base for managing resources in a nursing service:

1. nursing work is temporal and goes on 24 hours a day;
2. patient conditions may change drastically and often during a hospital stay;
3. the amount of time nurses spend with patients represents the nursing cost;
4. nurses consider each patient unique; however, the study of many patients over time reveals patterns of need for care which are comparable;
5. nurses differ in education, competence, and experience; and
6. the size of the nursing staff in different hospitals varies considerably.

Vanputte et al. (1985) describe in detail the work of determining nursing care hours per patient day per category of acuity on each patient unit as determined by PCS. Total time for each category is the sum of the average direct care time and the average of other patient assignable time. The hospital has used this investigation's basic data to support a system of variable billing for nursing care and for productivity monitoring. The authors state the test method is reliable and can be reproduced over time and across institutions.

Sovie and Smith (1986) describe some of the decision rules to determine an hourly rate:

1. The type of hourly rate must be determined -- will it be unit specific or applied across all hospital units?

2. What is the effect of staff mix on hourly rate?

3. What is the definition of direct care and indirect care costs?

4. Will all or part of nursing administrative costs be included?

5. Which nursing accounts are excluded because they have already been charged as separate rates and have not been bundled in the room and board charge (e.g., outpatient, operating room)?

6. How will unit secretaries and unit supplies be billed?

Ballard et al. (1985) also describe establishing standards of care which are hours of care specific to acuity levels on each unit. Nursing must gather a data base for a minimum of 1 year to develop adequate data for assessment of trends and patterns to determine that the information is reliable.

VII. COSTING SYSTEM

Van Slyck (1985) and Sovie and Smith (1986) state it is essential that the nursing department work very closely with the finance department because the nursing cost system must interface with the hospital cost accounting system. Other departments intimately involved with the costing system include billing and medical records. Decisions must be made on defining which costs to include: direct patient care; indirect care; nursing administration, supervision, and education; non-productive time, hospital overhead, contributions to profit; and how to allocate total costs to the individual patient based on acuity level. (Van Slyck 1985; Maher and Dolan 1982; Sovie and Smith 1986; Mitchell et al. 1984; Riley and Schaefers 1983).

The reader must search each literature source for definitions of terms and formulas. There is no universally accepted answer to which costs to include in the formula and how to determine the appropriate variable cost per patient.

Large quantities of data make computerization advantageous to accomplish interface of medical records abstracts, financial data, and nursing cost data. When there is a hospital information system department, the ability to retrieve, sort, and analyze data is enhanced (Marks 1987; Sovie and Smith 1986; Poulsen and Tvedtness 1985).

Van Slyck (1985) describes the details of setting up the costing system. Major points include:

1. The PCS and staffing system must be implemented and functional for a period of time to provide data about the acuity distribution of patients over time and the nursing resources consumed at each acuity level.

2. All costs must be captured.

One early formula for costing was presented by Wood (1982), who suggests four categories of cost:

1. cost per patient or hospitalization cost one time per admission;

2. cost per patient day -- basically hotel charge plus meals;

3. cost of clinical care units which varies day-by-day depending upon the patient diagnosis and level of recovery; and

4. ancillary services.

Riley and Schaefers (1983) present a straightforward formula: total hospital charges equal nursing costs plus non-nursing costs. The authors show in detail how nursing costs are determined using this formula including decision rules and definitions.

Bargagliotti and Smith (1985) detail formulas for determining both unit-specific cost of care giver per hour and determining indirect costs (nursing administration, inservice education, clinical specialist, unit managers, and secretary).

Maher and Dolan (1982) also present information on determining the nursing care cost for an individual patient including both fixed and variable costs. Variable costs are based on the amount of care provided as determined by PCS. Fixed cost is based on the indirect services provided to the patient by the nursing service department.

Meyer (1985) details the steps to determining total nursing cost per hour, which include administration and allocated overhead. Trofino (1986) describes the Reality Based System for Pricing Nursing Services (RBS) as an alternative to RIMs. RBS recognizes two categories of nursing costs: direct nursing costs (associated with nursing process) and total nursing costs (100 percent of nursing department including those who are not care givers).

Cleverley (1984) provides a description from the perspective of the finance officer of how PPS and DRGs demand a new costing program in hospitals. He explains eight key principles of

costing for hospital executives and provides examples of how costing information is valuable as a management tool.

Young et al. (1985) describe a patient classification and cost weighting system that is consistent with the medical care process and show the system applicability and usefulness in measuring nursing costs and productivity. This case mix system was developed under HCFA grant by Blue Cross of Western Pennsylvania. Patient management categories (PMC) are designed to represent clinically specific patient types, each requiring a distinct diagnostic and treatment strategy (patient management path) for effective care. Nursing costs can be associated with clinically specific patient types by averaging the nursing costs of all patients assigned to each PMC.

McSweeney et al. (1985) describe hospital financial management in terms of the "cost cube" where multiple uses require multiple views and attributes. The authors describe three dimensions of profitability (efficiency, effectiveness, and marketing) and describe data required for each and how data can be used in a variety of financial decisions. This article supports the use of nursing workload measures (instead of patient day) to reflect the accurate estimate of nursing resources consumed by the patient.

Thomas and Vaughan (1986) propose that keeping track of nursing resources used by each hospital inpatient does not have to be a cumbersome process. The authors present an inexpensive, straightforward approach to generate management information on nursing acuity by DRG, payer, hospital service, or physician. The approach uses data flowing from the PCS to calculate relative value units (RVUs) where one point represents 10 minutes of nursing time. RVUs for each patient are recorded each shift so that average RVUs can be calculated for each patient each day to generate a variable charge for nursing care that is directly linked to nursing acuity.

Marks (1987) explains how PCS data and patient census data have been combined and enhanced through automation to produce a record of each patient's nursing requirements including LOS, hours of care by job class (RN, LPN, NA), and total hours of care. This record is a step toward costing nursing services at the University of Minnesota Hospital and Clinic.

VIII. VARIABLE BILLING

Variable billing for nursing services is currently in use in a number of hospitals across the country (Exhibit 1). The hospital demographics and specific approaches vary greatly. However, Van Slyck (1985) identifies several common characteristics:

1. The patient acuity level or severity index reflects services actually delivered to the patient rather than anticipated need for services.

2. The acuity level is retrievable in the patient's medical record.

3. The development of the classification system included a period of data collection of 1 to 3 years before nursing costs were identified and converted to charges.

4. The staffing standards needed to identify costs per patient day were established for the specific hospital.

5. Although the patient's acuity level might be determined on each shift, the costs are calculated per patient day, resulting in a 24-hour nursing care charge.

6. The nursing administration and finance departments collaborated on both the costing method that would be used and the final patient charge that was established, with finance making the final decision.

7. The hospital chose to implement variable billing as a direct result of marketing strategies and the perceived positive outcome of this approach.

8. The hospital has not experienced problems with third party payers over variable billing.

The earliest report in the literature about variable billing is Wood (1982) which describes a new accounting system, based on the amount of care each patient needs, introduced at Massachusetts Eye and Ear Infirmary in 1976. The article shows how charges and reimbursement based more directly on the labor and services involved helps hospitals plan more efficient use of nursing staff and other personnel and services and helps determine when hospital resources are being used most productively.

Higgerson and Van Slyck (1982) describe the variable billing system established at St. Luke's Hospital Medical Center in Phoenix, Arizona. This model combines a staffing, classification, and billing system using an integrated tool that is a permanent chart record. The advantages and disadvantages of variable billing are discussed.

Ballard (1985) also advocates variable billing and presents details of the costing system and definitions used at Hospital of Saint Raphaels in New Haven, Connecticut. Nursing charges include fixed components (unit costs, depreciation, allocated overhead and nursing administration, clinical nurse specialists, and staff non-productive time) and variable components (direct nursing costs, including unit secretary and head nurse).

Sovie and Smith (1986) describe a system for variable billing based on a PCS including details about how to establish an hourly rate and how to develop a billing system. The authors support variable billing stating, "No other industry could survive or, more importantly, thrive by assigning fixed charges for its major product lines when the amount of materials and work hours involved in producing those products vary significantly."

Pajor and Thompson (1986) review the suggested advantages of separate charges for nursing care:

1. identifying the revenue earned by the nursing department to offset the costs of those services;

2. facilitating systematic control of revenue and expenses for nursing, thus improving planning the management of the department;

3. generating data for administrative planning and decision making, especially related to DRGs; and

4. determining more equitable payment (patients pay for the amount of service provided), thus good public relations.

The authors state the major problem facing hospitals is not the implementation of nursing charges or the logistics of generating itemized charge, but the fact that the majority of third party data and billing systems do not recognize a unique charge for nursing.

Exhibit 1.
RESOURCES FROM HOSPITALS
VARIABLE BILLING

HOSPITAL/CONTACT PERSON	APPROXIMATE DATE STARTED VARIABLE BILLING
CHILDREN'S HOSPITAL 116 Beds Judy Haviland RN -- Nurse Administrator St. Paul, Minnesota (612) 298-8826	Mid 1982
COTTAGE GROVE HOSPITAL 65 Beds John Hoops -- Hospital Administrator Cottage Grove, Oregon (503) 942-0511	Early 1982
GEORGETOWN UNIVERSITY MEDICAL CENTER 539 Beds Eunice Kautzmann RN -- Nurse Administrator Washington, D.C. (202) 625-2501	July 1975
HOSPITAL OF ST. RAPHAEL 479 Beds Kristina Krail RN -- Nurse Administrator New Haven, Connecticut (203) 789-3000	October 1984 *
LAKE REGION HOSPITAL & NURSING HOME 144 Beds Annette McBeth RN -- Nurse Administrator Fergus Falls, Minnesota (218) 736-5475	Mid 1984
LDS HOSPITAL 465 Beds Toni Propotnik RN -- Nurse Administrator Salt Lake City, Utah (801) 321-1171	April 1986
MASSACHUSETTS EYE & EAR 174 Beds Judith Havey RN -- Nurse Administrator Boston, Massachusetts (617) 523-7900	Mid 1974
PARK RIDGE HOSPITAL 235 Beds Nancy Boyer RN -- Nurse Administrator Rochester, New York (716) 225-7150	January 1986
PRIMARY CHILDREN'S MEDICAL CENTER 164 Beds Helen Trauntvein RN -- Nurse Administrator Salt Lake City, Utah (801) 521-1221	Mid 1978 **
SACRED HEART GENERAL HOSPITAL 422 Beds Gail Gilbert RN -- Nurse Administrator Eugene, Oregon (503) 686-7300	April 1983
SAINT JOSEPH'S HOSPITAL AND HEALTH CENTER 351 Beds Alice L. Dahlen RN -- Nurse Administrator Tucson, Arizona (602) 296-3211	July 1986
ST. JOSEPH'S HOSPITAL 209 Beds Mary Ann Clark RN -- Nurse Administrator Minot, North Dakota (701) 857-2000	July 1981

BEST COPY AVAILABLE

Exhibit 1 (continued).

HOSPITAL/CONTACT PERSON	APPROXIMATE DATE STARTED VARIABLE BILLING
ST. LUKE'S MEDICAL CENTER 420 Beds Brian Lockwood, Chief Executive Officer Charlotte Katona RN -- Nurse Administrator Phoenix, Arizona (602) 231-0017 (602) 251-8100	July 1974
ST. MARY'S HOSPITAL MEDICAL CENTER 668 Beds Phyllis Ethridge -- Nurse Administrator Tucson, Arizona (602) 622-5833	January 1985
STANFORD HOSPITAL MEDICAL CENTER 668 Beds Malinda Mitchell RN -- Nurse Administrator Stanford, California (415) 723-5708	Mid 1974 **
STRONG MEMORIAL HOSPITAL 741 Beds Margaret Sovie RN -- Nurse Administrator Rochester, New York (716) 275-3455	1984
TENNESSEE CHRISTIAN MEDICAL CENTER 307 Beds Judy Silva RN -- Nurse Administrator Madison, Tennessee (615) 865-2373 (ext. 4510)	January 1984
UNITED HOSPITAL 350 Beds Rosemary Bartsch-Jacobson RN -- Nurse Administrator Grand Forks, North Dakota (701) 780-5200	January 1985
ABBOTT-NORTHWESTERN HOSPITAL Nancy Higgerson RN -- Nurse Administrator Minneapolis, Minnesota (612) 874-4200	
Ann Van Slyck RN -- President AVS & Associates, Inc. Phoenix, Arizona (602) 971-2041	

* Contact by letter only
** Does not separately bill for nursing but varies the room rate based on nursing hours of care

PERMISSION GRANTED BY EACH CONTACT PERSON

This is not an all inclusive list of hospitals that use variable billing, but rather identifies the hospitals that are willing to share information on their variable billing methodologies and experiences.

Ann Van Slyck, RN, MSN, CNAA
President
copyright 1986 AVS & ASSOCIATES, INC.
10829 North 23rd Street
Phoenix, Arizona 85028
(602) 971-2041

BEST COPY AVAILABLE

HOSPITALS WHICH ARE KNOWN TO BE COSTING NURSING SERVICES

Central Maine Medical Center
Lewiston, ME
Ione Campbell, Assistant Director of Nursing

Virginia Mason Hospital
Seattle, WA
Patricia Maguire, Assistant Director Nursing Services

University Hospitals of Cleveland
Cleveland, OH
Ed Halloran, Senior Vice President

Methodist Hospital
Omaha, NE
Helen Hoesing, Vice President, Nursing Service

St. Luke's Hospital
Phoenix, AZ
Charlotte Katona, Director of Nursing

Lutheran Medical Center
Wheat Ridge, CO

St. Paul Ramsey Medical Center
St. Paul, MN
Vicki Schaefers, Associate Hospital Director and
Director of Nursing

Riverview Medical Center
Red Bank, NJ
Joan Trofino, Vice President, Patient Care Services

Saint Marys Hospital
Rochester, MN
Bruce Frederick, Assistant Administrator Nursing

Shadyside Hospital
Pittsburgh, PA
Gail Wolf, Vice President, Nursing Administration

Lebonheur Childrens Medical Center
Memphis, TN
Suzanne Howard

IX. MANAGEMENT USES FOR COST DATA

If, as Pajor and Thompson (1986) state, the majority of data and billing systems do not recognize a unique charge for nursing and variable billing is not an option, should nursing departments still cost out nursing care provided? Yes. Nearly every author reviewed states that itemized nursing costs are valuable and necessary for managing the nursing department in 1987. There are three broad areas of management use for cost data.

Nursing cost per DRG, cost analysis, and cost control. DRGs are the current "product line," and nurse managers need to know nursing costs per DRG to receive an equitable percent of the payment under PPS. In addition, cost per DRG provides information about profitable and nonprofitable DRGs. Health Maintenance Organization (HMO) contracts can be evaluated by determining which DRGs are profitable and marketable. Studies can be conducted to determine whether care provided for high cost DRGs can be modified without damaging patient outcomes. Cost containment measures are built on real data. Comparing nursing costs for the same DRGs between nursing units provides information for studying the productivity and quality of individual units (Meyer 1985; Minyard 1986; Mowry and Korpman 1986; Fosbinder 1986; Vanputte 1985; Levine 1985; Lagona and Stritzel 1984; Halloran and Halloran 1985; Giovannetti 1985; McCormick 1986).

Long range staffing and budgeting. Gathering patient acuity and nursing resource use data over time provides information to plan increases or decreases in full time equivalents (FTEs) (Ballard 1985; Lagona and Stritzel 1984; Walker 1983; Ethridge 1985; Mason and Daugherty 1984).

Program development. Decisions about whether to develop specific new patient programs can be based on actual cost data (Poulsen and Tvedtnes 1985; Bargagliotti and Smith 1985; Cleverley 1984). McSweeney et al. (1985) state, "Product line costing and profitability analysis can take a number of forms, depending on the issue. Answers that are appropriate for pricing decisions may not be appropriate for strategic decisions such as initiating or closing programs. Hospitals need to understand how their variable costs differ from their average costs, how much of their total costs are comprised of patient service costs, and what the contribution margins are of their various programs in addition to their net profitability."

Nursing as a revenue center. Two authors propose that the relationship between nursing and the hospital be viewed not as a cost center, but as a revenue center. Riley and Schaefers (1984) describe how to establish the nursing department as a profit center using the mechanism of "transfer price" to establish fair and equitable monetary value for nursing services. This approach

provides incentive for efficient operation and innovative cost containment.

Ethridge (1985) points out that changing the perspective to nursing as a revenue center results in internal re-allocation of funds and does not necessarily mean increased charges to the consumer. In Ethridge's study, while overall hospital revenue was unaffected, the portion of that revenue attributable to nursing was identified and increased.

X. AUDIT SYSTEM

Valid and reliable data are essential to a nurse costing system. Whether the system supports variable billing or short- and long-term management decisions, accurate information is the key to a useful, reliable costing system.

Ballard (1985) explains the quality assurance function in relation to three aspects of the system: (1) reports are issued documenting compliance; (2) random sampling of concurrent charts are audited for validity; and (3) charges between the nursing and billing departments are verified.

Sovie and Smith (1986) state when patients are charged for nursing services, an audit trail must be clearly established. Documentation in the patient record should confirm that the nursing care warranted by the selected indicators was provided to the patient. Periodic audits must be conducted to verify that patients have received services for which they were billed and rater reliability is maintained.

Giovannetti (1985) also refers to the need for reliability, validity, and acceptability in a PCS. Reliability of data must be established and maintained in each setting.

Higgerson and Van Slyck (1982) emphasize that auditing is as important as any other system component and must address these areas:

1. accuracy of documentation,
2. case volume/classification level distribution,
3. staffing,
4. quality of care, and
5. patient billing.

BEST COPY AVAILABLE

Guidelines for developing an audit system are outlined by Van Slyck (1985). The goal is to ensure accuracy of the data as well as credibility of the PCS. The author states:

1. Audits should be completed by a non-nurse.

2. Audits should be done routinely on each nursing unit each month.

3. Formal audit reports should be developed and the results communicated to all levels within the organization.

4. Audits should be completed concurrently rather than retrospectively.

The importance of this step (audit system) cannot be overemphasized. Because the system produces data that will influence other short- and long-range decisions for the hospital, the accuracy of the data base should be continually evaluated.

XI. COST/QUALITY RELATIONSHIP

An important topic related to costing nursing is the relationship between cost and quality. Some of the articles concerning cost and quality are the following.

Donabedian (1984) uses graphs representing the relationship between improvements in health and monetary cost of effective health care strategies. The goals of quality assurance and cost containment are congruent to the extent that improvements in clinical efficiency reduce cost without injury to quality. There is conflict, however, to the extent that raising the level of quality calls for additional costs.

Larsen and Peters (1986) view costs of care as one essential quality indicator, and, therefore, evaluation of costs should be an integral and required component of all quality assurance studies. Their article compares the two major types of cost analysis (cost-benefit analysis and cost-effectiveness analysis), describes some of the problems with evaluating costs, and discusses ways to include consideration of costs in quality assurance.

Gross (1986) presents a quality and cost control model which uses statistical techniques common to industrial quality control and engineering combined with cost information generated by patient classification and nurse staffing systems. Auditing is an essential component of the model which compares total nursing time required to carry out the RN-assessed care plan with the total nursing time actually spent delivering the care for the same 24-hour period, as documented in the chart. The index

provides cost control alerts and quality control alerts. Gross provides guidelines for using the model.

Beyers (1986) promotes a long-range view of managing quality focusing on the processes and outcomes of clinical practice. Balancing cost and quality, taken from this perspective, assumes a new character. Key persons in the organization work together to establish efficient and effective management practices needed for efficient and effective clinical practices.

Wilson (1986) states cost analyses and quality assurance evaluations can be easily combined because the processes are similar: both begin with standards and criteria which are used to identify and solve problems. Several clinical examples are presented.

XII. FUTURE

DRG groupings are designed to measure hospital resource consumption. However, DRGs have been shown to explain only about 30 percent of the variability in resource use of hospitalized patients (Horn 1985). The DRG groupings based on medical diagnosis, age, and limited recognition of complications are insensitive to the stage of a patient's disease and intensity of his/her care needs. Patients with the same DRG vary in the stage of disease and in their ability to function independently. Therefore, patients within one DRG may consume very different amounts of hospital resources. Major research efforts have been expended and are currently being evaluated by HCFA to refine the DRG classifications to increase homogeneity of resource use within DRGs by accounting for severity of illness based on clinical data.

Horn (1985) and associates at Johns Hopkins developed the Severity of Illness Index (SII), a severity score on a four-level scale. Scores are determined for each of seven individual dimensions chosen to reflect severity of illness:

1. the stage of the principal diagnosis at admission;

2. complications due to the principal disease as a direct result of the therapy or hospitalization;

3. pre-existing problems (comorbidities);

4. the degree to which the patient is physically dependent throughout the hospitalization and requires more than the minimal level of direct nursing care expected for the principal diagnosis;

5. diagnostic and therapeutic procedures performed outside of the operating room;

6. patient's response to hospital treatment for the principal diagnosis, complications, and interactions; and

7. the extent to which a patient shows residual evidence of the acute injury or illness at the time of discharge.

To determine the severity of illness score for an individual patient, a trained rater scores each of the seven dimensions at one of four levels of increasing severity by examining data in the patient's medical record following discharge.

The Horn group reports that severity data, collected at more than 60 hospitals, have shown that DRGs refined by the 4-level SII explain more than 60 percent of the variability in patient resource use. However, Curtin (1985) reports that critics find the system is too costly, too subjective, and has not been computerized.

A second tool being used to measure severity of illness is Medical Illness Severity Grouping System (MedisGroups). This system gives a patient an admission severity score based on a set of physiological variables and clinical and x-ray findings. Group 0 represents cases with no key clinical finding; Group 1 indicates minimal findings with low potential for organ failure; Group 3 includes patients with both severe and acute findings; Group 4 indicates critical findings including organ failure. A study reported by Brewster (1985) showed a statistically significant direct relationship between admission severity group and total charges, ancillary charges, and LOS. Critics point out (Curtin 1985) that the system would be difficult to merge with DRGs since it does not operate on Uniform Hospital Discharge Data Set (UHDDS); the system is applicable only to the critically ill; and there is no recognition of nursing intensity of service.

A third system for classifying patients according to severity of illness is AS-SCORE described by Panniers and Tomkiewicz (1985). This system uses variables of age, body system, and disease stage to indicate severity of illness and adds the variables of complications and response to therapy to indicate both severity and resource utilization. Panniers and Tomkiewicz report patient groups in DRG 121 (myocardial infarction (MI) with cardiovascular complications, discharged alive) and DRG 122 (MI without cardiovascular complication, discharged alive) as measured by the AS-SCORE tool are only slightly more homogeneous than the original DRGs with regard to LOS and total charges. However, when combined with a cost accounting system for nursing services, the system is sensitive to patient's nursing care requirements.

The Acute Physiology and Chronic Health Evaluation (APACHE) system of measuring severity of illness was developed at George Washington University and measures therapeutic effort and resource costs in intensive care units (Jones 1984). This system

is not based on particular diagnoses, but uses admission values on 12 physiological variables (such as blood pressure, respiratory rate, hematocrit) to rank severity of illness. One component of the APACHE system, the Therapeutic Intervention Scoring System (TISS), consists of a list of 75 clinical tasks, mostly performed by nurses, with assigned weights of 1 to 4. This recognition of nursing interventions is unique among severity of illness tools. Critics point out (Curtin 1985) that APACHE's applicability is limited to critically ill patients and it does not use the UHDDS.

PMCs, developed by Blue Cross of Western Pennsylvania, group patients according to day admitting diagnoses, co-morbidities, and multiple diagnoses. Dollar values are assigned by predicting costs of services according to what a group of physicians determines to be the optimal, effective "treatment path" (Curtin 1985). The system has been computerized for use with UHDDS. The information and judgments used to develop the management paths were developed using records from six Pennsylvania hospitals and an advisory panel composed of full-time hospital physicians and senior residents who were experts in managing each particular medical problem (Jones 1984).

To summarize, HCFA may use any one (or none) of these methods to modify the current prospective pricing system. Nurse administrators who can identify nursing cost per patient will be prepared to identify costs if and/or when the DRG system is modified.

Help in the area of costing nursing services will be available soon from the National League for Nursing, which is establishing a clearinghouse for costing nursing as part of an Unbundling Network, which will consist of nurse executives involved in costing activities who are willing to share information on tools, barriers to overcome, and educational materials about costing nursing services.

A number of forces will shape the future for the nursing profession and for the issue of costing nursing services. The current decline in the number of registered nurse students will directly affect the number of baccalaureate educated nurses available to provide care at a time when nursing's future practice will be based on greater use of scientific and research data related to the technology explosion in health care. Other future predictions have been summarized by the Governing Board of the National Commission on Nursing Implementation Project (1986) and include the following:

- The business orientation will continue in the health care industry resulting in structural changes as well as delivery changes.

- The business orientation will require more precise justification for costs and substantive data on results of interventions.

Costing nursing services holds the promise of assisting nurses and nursing to move into the future prepared to meet the challenges. Sovie and Smith (1986) make the best case for costing hospital nursing services by reviewing the impact on the profession,

> "The identification of nursing costs helps nurses understand the business aspects of their practice . . . Nurses know that in 1986 they are expected to generate $27 million in revenue. This context for practice differs drastically from the prior era in which we inaccurately believed that nurses and nursing care were responsible for high costs and therefore would be the first place for reductions when the belt tightened . . . Economic and professional accountability are building blocks of successful image makers. The excellence of nursing care is recognized, and charges are generated based on the variable needs and care given to individual patients. We are no longer invisible. Coming out of the room rate and charging for nursing care feels great!"

GLOSSARY OF TERMS

ACUITY

The degree of illness. The complexity of relative amount of nursing care required by a patient, as determined by the sum of predetermined indicators and represented by the category from the patient classification system.

CAPITATION SYSTEM

The hospital receives a fixed amount for each patient in its service population regardless of specific costs (pay per enrollee). Virtually all European countries use some form of capitation to pay for health care (Mowry and Korpman 1986).

CASE-MIX

The distribution of different types of patients seen at a setting. The collection of case types usually organized by DRG.

CASE-MIX INDEX (CMI)

A measure of how sick the patients are who are treated at the hospital.

CHARGE

The amount set by the producer for purchase of the product. The charge usually is set to cover all direct costs, a portion of indirect costs, and a percentage of profit.

COEFFICIENT OF VARIATION

A measure of relative dispersion frequency distribution. The standard deviation is divided by the mean.

COMPLIANCE

The degree to which a classification system is understood and used correctly by staff.

COST

Identification of the expenses incurred in producing goods or services for marketing; a component of pricing.

COST CENTER

An organizational unit that performs a function using specific resources. The smallest functional unit for which cost control and accountability can be assigned under the existing accounting system.

DIAGNOSIS RELATED GROUP (DRG)

A disease-based patient classification system used by Medicare to determine the payment for medical care under the Prospective Payment System.

DIRECT COST

Those costs associated with providing the "hands on" aspects of care. A cost which is associated on a one-to-one basis with the product. The cost can be uniquely tied to the product.

DIRECT TIME

All patient centered activity carried out directly with the patient/family (e.g., admission history and assessment, hygiene, medications, teaching, treatments).

EFFICIENCY

The ratio of actual work to energy expended in producing the product.

EXPENSE CENTER

An accounting term used to designate departments which do not generate income directly but do generate costs.

FACTOR INSTRUMENT

Patient classification tool in which specific elements of care are given a numerical value and an overall rating score for each patient is determined.

FIXED COST

A cost which does not vary with volume produced. Fixed costs are always specified within set parameters of time.

HCFA

Health Care Financing Administration.

INDIRECT CARE

Those activities performed by the nurse which are related to patient care but not in direct contact with the patient.

INDIRECT COST

A cost which is not uniquely tied to one product item, but is spread over many items (e.g., a supervisor's salary).

INLIERS

Patients whose length of stay falls within the expected length of stay for that DRG.

INTER-RATER RELIABILITY

Every person who evaluates the patient using the system arrives at the same result.

NONREVENUE COST CENTER

An organizational unit that provides a service or function for which a charge is not generated; thus revenue is not gained (e.g., nursing administration).

OUTCOME

The results; the goal to be achieved.

OUTLIERS

Those patients whose length of stay exceeds the established national average length of stay for that DRG.

PATIENT CLASSIFICATION SYSTEM (PCS)

Organize the patient population into homogeneous groups based on predetermined criteria (i.e., patient acuity is based on patient dependency; DRG is based on medical diagnoses; nursing intensity indexes are based on intensity of nursing care required).

PERSONAL TIME

Paid time spent on breaks, personal errands, or personal hygiene.

PRODUCTIVITY

In a production model, the ratio of output to input. In nursing, the output of the nursing process as measured by the number of patients receiving care on the unit, weighted by their acuity level divided by input of the nursing process as measured by the equivalent number of RN hours available, adjusted by the quality of care provided (Levine 1985).

PROSPECTIVE PAYMENT

Providers are paid at rates set in advance and the rates are dependent upon certain criteria.

PROTOTYPE INSTRUMENT

Patient classification tool which uses broad descriptions and characteristics of typical patients in each category as a guide for measuring acuity levels of other patients. This type tool is thought to be a more subjective than the factor type instrument.

QUALITY

A property of and judgment upon a definable unit.

RELIABILITY

The dependability, stability, consistency, or repeatability of a measure.

RESOURCE ALLOCATION

The consumption of resources (time, personnel, supplies) toward a specific goal or set of goals.

RESOURCE UTILIZATION

The consumption of assets. The kinds and numbers of items (e.g., nursing hours, chest x-rays, operating room hours) used in performing patient care.

RETROSPECTIVE REIMBURSEMENT

Payment after completion of service. The charge varies directly with the amount of service provided.

REVENUE CENTER

An accounting term used to designate departments which generate income. Organizational units that provide identifiable and reimburseable services to the patient.

SEMI-VARIABLE COST

A cost which is affected by the amount produced but not in direct proportion. Costs increase in step-like fashion (remain the same despite volume changes) until a decision point is reached.

STAFFING SYSTEM

Allocation of nursing resources for each acuity level according to predetermined standards.

STANDARD

A level of performance or a set of conditions considered acceptable by some authority or by the individual(s) engaged in performing or maintaining the set of conditions.

TASK

A discriminant action, either direct or indirect care, which a member of the nursing staff carries out in the process of caring for a patient and family.

TOTAL NURSING COSTS

All direct costs plus all indirect costs. Reflects resources necessary for a nursing infrastructure, which creates an environment for providing the nursing care.

UHDDS

Uniform Hospital Discharge Data Set.

UNIT CONSTANT TIME

Devised for each unit by adding the average unit-related hours per patient day to the average personal hours per patient day. Each patient, regardless of category of acuity, received an equal assignment of unit constant time.

UNIT RELATED ACTIVITIES

Those tasks necessary for the general management, coordination, and organization of the unit. They are not related to a particular patient (i.e., housekeeping, checking stock, clerical activities) (Sovie).

UNIT RELATED TIME

The time related to the entire unit and its patient population group and all productive activity in support of the unit but not directly related to patients (e.g., committee work, charge nurse activities, narcotic count).

VALIDITY

The extent to which the tool measures what it was intended to measure.

VARIABLE BILLING

Billing for specific aspects or levels of nursing care which vary from patient to patient and from day to day.

VARIABLE COST

A cost which is affected in direct proportion by the amount produced.

VARIANCE

The difference between what is expected and what actually happened.

REFERENCES

Aydelotte, M. Nurse Staffing Methodology: A Review and Critique of Selected Literature. DHEW Pub. No. 73-433. Washington, DC: U.S. Government Printing Office, 1973.

Ballard, D.; Barach, K.; and Cullen, J. The variable nursing charge system at the hospital of Saint Raphael. In: Shaffer, F., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Bargagliotti, L.A., and Smith, H. Patterns of nursing costs with capitated reimbursement. Nursing Economics 3(5):270-275, September/October 1985.

Beyers, N.; Corbett, N.; and Janson, R. Tracking productivity: an easy, quick and useful way. Nursing Management 17(1):35-42, January 1986.

Brewster, A.; Bradbury, R.; and Jacobs, C. Measuring the effect of illness severity on revenue under DRGs. Healthcare Financial Management 52-60, July 1985.

Caterinicchio, R. Relative intensity measures: pricing of inpatient nursing services under diagnosis-related group prospective hospital payment. Health Care Financing Review 6(1):61-70, Fall 1984.

Caterinicchio, R. A debate: RIMs and the cost of nursing care. Nursing Management 14(5):36-43, May 1983.

Cleverley, W. Cost accounting pins a value to DRGs. Modern Healthcare 172-179, April 1984.

Cromwell, J., and Harrow, B. "An Evaluation of Medicare's Current Method of Allocating Nursing Costs and Examination of Alternative Approaches." Paper prepared for Prospective Payment Assessment Commission, Washington, DC, April 4, 1986.

Cromwell, J., and Harrow, B. "Summary and Critique of Literature Related to Allocating Nursing Costs, Nursing Skill Level and Quality of Care, and the Relationship Between Nursing Intensity and Patient's Severity of Illness." Paper prepared for Prospective Payment Assessment Commission, Washington, DC, April 4, 1986.

Curtin, L. Determining costs of nursing services per DRG. Nursing Management 14(4):16-20, April 1983.

Curtin, L. Determining acuity: the frugal road to safe care. Nursing Management 16(9):7-9, September 1985.

Curtin, L. Who says 'lean' must be 'mean'. Nursing Management 17(1):7-8, January 1986.

Curtin, L. DRG creep, DRG weights and patient acuity. Nursing Management 14(10):7-9, October 1984.

Curtin, L., and Zurlage, C. DRGs: The Reorganization of Health, Chicago: S-N Publications, 1984.

Daugherty, J. A perspective on the costing of nursing services. Health Care Industry Update (Price Waterhouse), June/July 1986.

Deines, E. Coping with PPS and DRGs: the levels of care approach. Nursing Management 16(10):43-52, October 1985.

Dieter, B. Determining the cost of nursing services. Hospital Cost Accounting Advisor 2(9):1, 5-7, February 1987.

Dijkers, M., and Paradise, T. PCS: one system for both staffing and costing. Nursing Management 17(1):25-34, January 1986

Diomede, B. DRGs and surgical procedures: a survey of hospitals' cost analyses. AORN Journal 42(6):912, 914, 916, December 1985.

DiVestea, N. The changing health care system: an overview. In: Shaffer, F.A., ed. Costing Our Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Donabedian, A. Quality, cost and cost containment. Nursing Outlook 32(3):142-145, May/June 1984.

Donabedian, A.; Wheeler, J.; and Wyszewianski, L. An integrative model of quality, cost, and health. In: Hospital Quality Assurance: Risk Management and Program Evaluation. Rockville, MD: Aspen Publishers, 1984.

DRGs offer basis to convert nursing to revenue center. Prospective Payment Survival 4(12):165-170, December 1986.

Ethridge, P. The case for billing by patient acuity. Nursing Management 16(8):38-41, August 1985.

Fagin, C.M. Opening the door on nursings' cost advantage. Nursing and Health Care 7(7):353, September 1986.

Final Report of the Ad Hoc Committee on Nursing Administration Research. Nurse Executive Sourcebook Series No. 1, Chicago: American Organization of Nurse Executives, 1987.

Fosbinder, D. Nursing costs/DRG: a patient classification system and comparative study. Journal of Nursing Administration 16(11):88-91, November 1986.

Giovannetti, P. DRGs and nursing workload measures. Computers in Nursing 3(2):88-91, March/April 1985.

Giovannetti, P.; Edwardson, S.; and Busch, W. "Relationship Between DRGs and Patient Classification Data for Nursing Costs and Allocations." Paper presented at American Society for Nursing Service Administrators, Chicago, October 24, 1984.

Giovannetti, P., and Mayer, G. Building confidence in patient classification systems. Nursing Management 15(8): 31-34, August 1984.

Giovannetti, P., and Mayer, G. "Maintenance Mechanisms and Survival Strategies for Patient Classification Systems." Paper published by Health Management Systems Associates, Minneapolis, 1984.

Grimaldi, P., and Michelette, J. RIMs and the cost of nursing care. Nursing Management 13(12):12-22, December 1982.

Grohan, M.E.; Myers, J.; and McSweeney, M. A comparison of patient acuity and nursing resource use. Journal of Nursing Administration 16(6):19-23, June 1986.

Gross, K. A quality and cost control model for managing nursing utilization. Journal of Nursing Quality Assurance 1(1):36-46, November 1986.

Halloran, E. Nursing workload, medical diagnosis related groups and nursing diagnosis. Research in Nursing & Health 8(4):421-433, December 1985.

Halloran, E., and Halloran, D. Exploring the DRG/nursing equation. American Journal of Nursing 85(10):1093-1095, October 1985.

Halloran, E.; Patterson, C.; and Kiley, M. "A Decision Support Mechanism to Complement the DRG: Monitoring Bed Utilization, Preventing Premature Discharge, Measuring Intensity of Illness, and Costing Nursing Care." Unpublished paper from the author, 1986.

Halloran, E., and Kiley, M. Case mix management. Nursing Management 15(2):39-45, February, 1984.

Higgerson, N., and Van Slyck, A. Variable billing for services: new fiscal direction for nursing. Journal of Nursing Administration 12(6):20-27, June 1982.

How much does nursing care really cost: Stanford DRG study reveals dramatic differences. American Journal of Nursing 84(7):942-943, July 1984.

Horn, S.D. Severity of illness within DRGs: impact on prospective payment. American Journal of Public Health 75(10):1195-1199, October 1985.

Horn, S.D. Interhospital differences in severity of illness. New England Journal of Medicine 313(1):20-24, July 4, 1985.

Horn, S.D. A plan to modify DRGs. Business and Health 32-35, September 1985.

Horn, S.D. Measuring severity: how sick is sick? how well is well? Healthcare Financial Management 21-32, October 1986.

Joel, L. DRGs: the state of the art of reimbursement for nursing services. Nursing and Health Care 3(12):560-563, December 1983.

Jones, K. Severity of illness measures: issues and options. Nursing Economics 2(5):312-317, September/October 1984.

Kirby, K. Issues in nursing resource management: past and present. Nursing Economics 4(6):305-309, November/December 1986.

LaBar, C., and McKibbin, R. New Organizational Models and Financial Arrangements for Nursing Services. Kansas City: American Nurses' Association, 1986.

Lagona, T., and Stritzel, M. Nursing care requirements as measured by DRG. Journal of Nursing Administration 14(5):14-181, May 1984.

Larson, E., and Peters, D. Integrating cost analyses in quality assurance. Journal of Nursing Quality Assurance 1(1):1-7, November 1986.

Lawrenz, [illegible] Perspectives on Staffing/Scheduling, Vol. IV, No. 6. Mo[illegible]air, NJ: Nursing Management Services, Inc., November 198[illegible].

Levine, E. Some issues in nursing productivity. In: Shaffer, F.A., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Maher, A.B., and Dolan, B. Determining cost of nursing services. Nursing Management 13(9):17-21, September 1982.

Mark, B., and Smith, H. Essentials of Finance in Nursing. Rockville, MD: Aspen Publishers, 1987.

Marks, F. Refining a classification system for fiscal and staffing management. Journal of Nursing Administration 17(1):39-43, January 1987.

Mason, E.J., and Daugherty, J. Nursing standards should determine nursing's price. Nursing Management 15(9):34-38, September 1984.

McClain, J., and Selhat, M. Twenty cases: what nursing costs per DRG. Nursing Management 15(10):27-34, October 1984.

McCormick, B. What's the cost of nursing care? Hospitals 48-52, November 5, 1986.

McKibbin, R. DRGs and Nursing Care. Kansas City: American Nurses' Association Center for Research, 1985.

McKibbin, R.C. Nursing costs and DRG payments. American Journal of Nursing 85(12):1353-1356, December 1985.

McSweeney, J.; Hebert, M.; and Holroyd, R. Cost accounting strategies under prospective payment system. Topics in Health Care Financing 11(3):28-46, Spring 1985.

Meyer, D. Costing out nursing care with the GRASP system. In: Shaffer, F.A., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Minyard, K.; Wall, J.; and Turner, R. RNs may cost less than you think. Journal of Nursing Administration 16(5):28-34, May 1986.

Mitchell, M.; Miller, J.; Welches, L., et al. Determining cost of direct nursing care by DRGs. Nursing Management 15(4):29-32, April 1984.

BEST COPY AVAILABLE

Mowry, M., and Korpman, R. Do DRG reimbursement rates reflect nursing costs? Journal of Nursing Administration 15(7,8):29-35, July/August 1985.

Mowry, M., and Korpman, R. Managing Health Care Costs, Quality and Technology. Rockville, MD: Aspen Publishers, 1986.

National Commission on Nursing Implementation Project. Report to the Invitational Conference. Milwaukee: November 7, 1986.

Nyberg, J., and Wolff, N. DRG panic. Journal of Nursing Administration 14(4):17-21, April 1984.

Pajor, J.; Thompson J.; and Diers, D. Variable Charging for Routine Nursing Care at The Hospital of Saint Raphael. A Case Study. New Haven: Yale University, June 1986.

Panniers, T., and Tomkiewicz, Z. The ICD9CM DRGs: increased homogeneity through use of AS-SCORE. Quality Review Bulletin 47-52, February 1985.

Patient management categories: a resource cost oriented alternative to diagnosis related groups. Hospital Cost Accounting Advisor 2(9):1-4, February 1987.

Planning, budgeting, and controlling -- one look at the future case mix cost accounting. Health Services Research 14(2):111-125, Summer 1979.

Porter-O'Grady, T. Strategy Planning: nursing practice in the PPS. Nursing Management 16(10):53-56, October 1985.

Poulsen, G., and Tvedtnes, J. Standard costing. Computers in Healthcare 34-36, March 1985.

Prescott, P. DRG prospective reimbursement: the nursing intensity factor. Nursing Management 17(1):43-48, January 1986.

Proceedings of the National Invitational Conference on Nursing Productivity. Washington, DC: Georgetown University Hospital, April 16-18, 1986.

Punch, L. More hospitals turn to software for documenting nursing costs. Modern Healthcare 15(13):88, 91-93, June 21, 1985.

Reitz, J. Toward a comprehensive nursing intensity index: part I development. Nursing Management 16(8):21-30, August 1985.

Reitz, J. Toward a comprehensive nursing intensity index: part II testing. Nursing Management 16(9):31-42, September 1985.

Report of Invitational Meeting to Discuss Research Related to Cost of Nursing Services and Impact of Prospective Pricing on Quality of Care. Washington, DC: American Nurses' Association Center for Research, November 15, 1985.

Reschak, G. Accounting for nursing costs by DRG. Journal of Nursing Administration 15(9):15-20, September 1985.

Rieder, K.A., and Kay, T.L. Severity of illness within DRGs using a nursing patient classification system. In: Shaffer, F.A., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Riley, W., and Schaefers, V. Costing nursing services. Nursing Management 14(12):40-43, December 1983.

Riley, W., and Schaefers, V. Nursing operations as a profit center. Nursing Management 15(4):43-46, April 1984.

Sandrick, K. Pricing nursing services. Hospitals 16(59):75, 77-78, November 16, 1985.

Schaefers, V. A cost allocation method for nursing. In: Shaffer, F.A., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Severity of illness and hospital payment. Medicine and Health Perspectives 39(10), March 11, 1985.

Shaffer, F.A. A nursing perspective of the DRG world, part I. Nursing and Health Care 4(1):48-51, January 1984.

Shaffer, F.A., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Shaffer, F.A., ed. Patients and Purse Strings. New York: National League for Nursing, 1986.

Sherman, J. DRG 001: a multihospital comparison. Nursing Management 17(10):17-20, October 1986.

Sovie, M. Managing nursing resources in a constrained economic environment. Nursing Economics 3(2):85-94, March/April 1985.

BEST COPY AVAILABLE

Sovie, M., and Smith, T. Pricing the nursing product: charging for nursing care. Nursing Economics 4(5):216-226, September/October 1986.

Sovie, M.; Tarcinale, M.; Vanputte, A., et al. Amalgam of nursing acuity, DRGs and costs. Nursing Management 16(3):22-42, March 1985.

Staley, M., and Luciano, K. Eight steps to costing nursing services. Nursing Management 15(10):35-38, October 1985.

Stanfill, P.H., and McDonnell, J.W. Determining nursing costs: a strategy for professional survival. Oncology Nursing Forum 12(5):79-82, September/October 1985.

Thomas, S., and Vaughan, R.G. Costing nursing services using RVUs. The Journal of Nursing Administration 16(12):10-16, December 1986.

Thompson, J.D., and Diers, D. DRGs and nursing intensity. Nursing and Health Care 6(8):435-439, October 1985.

Toth, R. DRGs: imperative strategies for nursing service administration. Nursing and Health Care 5(4):197-203, April 1984.

Trofino, J. A reality based system for pricing nursing service. Nursing Management 17(1):19-24, January 1986.

Trofino, J. RIMs: skirting the edge of disaster. Nursing Management 16(7):48-51, July 1985.

Vanderzee, H., and Glusko, G. DRGs, variable pricing, and budgeting for nursing services. Journal of Nursing Administration 14(5):11-14, May 1984.

Vanputte, A. Accounting for patient acuity: the nursing time dimension. Nursing Management 16(10):27-36, October 1985.

Van Slyck, A. Nursing service: costing, pricing and variable billing. In: Shaffer, F.A., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

Vaughan, R., and Macleod, V. Nurse staffing studies: no need to reinvent the wheel. Journal of Nursing Administration 10(3):9-15, March 1980.

Walker, D.D. The cost of nursing care in hospitals. Journal of Nursing Administration 13(3):13-18, March 1983.

BEST COPY AVAILABLE

Wilson, C.K. Strategies for monitoring the cost and quality of care. Journal of Nursing Quality Assurance 1(1):55-64, November 1986.

Wood, C. Relate hospital charges to use of services. Harvard Business Review 123-130, March/April 1982.

Young, J.P.; Giovannetti, P.; Lewison, D., et al. Factors Affecting Nurse Staff in Acute Care Hospitals: A Review and Critique of the Literature. DHEW Pub. No. (HRA) 81-10. Washington, DC: U.S. Government Printing Office, 1981.

Young, W.; Patterson M.; Groetzinger, S., et al. Patient management categories and the costs of nursing services. In: Shaffer, F.A., ed. Costing Out Nursing: Pricing Our Product. New York: National League for Nursing, 1985.

BHPr
BHPT

U.S. DEPARTMENT OF
HEALTH & HUMAN SERVICES
Public Health Service
Health Resources and Services Administration
Bureau of Health Professions

BEST COPY AVAILABLE